

Water Intrusion

“The culprit of many problems”

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Water Intrusion

- Site condition
- Gutter systems
- Ventilation
- Mold

Site Condition

- Wooded, Swampy, Open lot, Windy
- Grading & vegetation

So why does this make a difference when
doing construction?

Wooded Lot



New Basement Rec. Room



Dampness causes issues



Sometimes issues are bigger than what appears on the surfaces!!



Sometimes issues are bigger than what appears on the surfaces!!



Wet/Swampy location









Open Lot

Windy areas



Windy Areas





As A contractor:

- Take into consideration your surroundings
- Take into consideration the age of material you are attaching to
- Understand the effect of what you do on the people you work for

Grading & Vegetation

- Hillside grade
- Final grade
- Hatchways
- Patios, Driveways, walkways

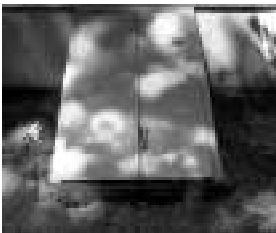
Hillside Grade



Final grade



Hatchways & basement entries



Hatchways & basement entries



Hatchways & basement entries



Patios, driveways & walkways

- Need to be pitched to drain water away from the structure.



Gutters

- ***“To have or Not to have”*** That is the question
- Sizing
- Directing

Without gutters no cleaning?



How can you control the water?



Sizing the beast...

Using a 3 step process!

- ❶ Calculate the roof's watershed area
- ❷ Find the maximum Likely rainfall intensity
- ❸ Determine the gutter needed to drain the watershed

Calculate the roof's watershed area

1. Calculate your roof's watershed area -- A roof's watershed area isn't obvious. Maximum rainfall is likely wind driven, so steep roofs may collect more water than flat roofs. To figure a roof's watershed area, multiply its surface area by the appropriate factor on the table.

Roof pitch	Factor
12-in-12	1.3
9-in-12 to 11-in-12	1.2
6-in-12 to 8-in-12	1.1
4-in-12 to 5-in-12	1.05
Flat to 3-in-12	1

Find The Maximum likely rainfall intensity

2. Residential gutters are often planned to handle the most intense five-minute burst of rain, measured in inches per hour, that's likely to occur in a ten-year period. Find yours on the map



Determine the gutter needed to drain the watershed

- Divide your favored gutter's 1-in.-per-hour watershed (from the chart) by the five-minute rainfall intensity (from the map). This determines the maximum watershed level the gutters can serve between downspouts. Pitch your gutters by 1/8 in. per ft., and you can multiply the watershed by 1.4.
- Each square inch of downspout cross section can drain 100 sq. ft. of watershed. So a 2-in. by 3-in. spout drains up to 600 sq. ft., and a 3-in. by 4-in. spout drains 1,200 sq. ft.
- Going from one downspout to two doubles the watershed that a section of gutter can drain

Gutter Sizing example:

Sample house -- An 8-in-12 pitch roof section in Connecticut is 40 ft. wide, and its rafter length is 20 ft. The roof's area is 800 sq. ft. The pitch factor for an 8-in-12 pitch roof is 1.1; when multiplied by 800 sq. ft., that gives a watershed of 880 sq. ft. The theoretical 5,520-sq. ft. watershed drained by a 5-in. K-style gutter, divided by Connecticut's 6.0-in.-per-hr. rainfall intensity, shows a maximum watershed of 920 sq. ft. Close, but to be safe, the builder should pitch the gutter 1/8" per foot and either use a larger gutter or add another downspout. In this case he added a second downspout.



Ventilation

Underrated & Misunderstood

Insufficient Ventilation

- Cause of early roof failures
- Cause of condensation - lead to mold
- Contributor to sick house syndrome
- Contributor to other health issues

Basements & crawl spaces

Ventilate

or

Condition

That is the question??

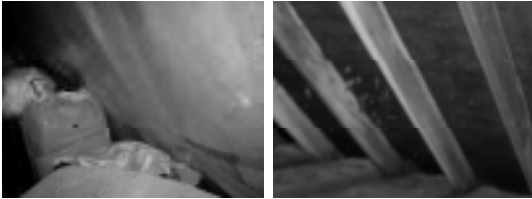
Condition your space below grade!



Condition your space below grade!



Attic - Ventilate



Home Interior

- Bathrooms & Kitchens
Produce most of the moisture
in the living space & need a
means to move the moisture to
the exterior.



Home Interior



Mold vs. Mildew

- Both are fungi
- Mold grows on almost any organic material
Leaves, fabrics, paper, wood, food, paint, dust, etc.
- Mold will also grow on soap scum, dust and paint that are on non-porous surfaces such as tile, metal and fiberglass/vinyl
- Mildew grows on living plants

What does it take for Mold to grow?

✓ **Air**

✓ **Food**
(Fabric, Paper, Paint, Dust etc.)

✓ **Water**

Where does the moisture come from?

- Interior
- Exterior

Proper Clean up

- No Bleach on porous surfaces



Don't work outside your scope of knowledge!!



Where is mold lurking?



There it is!!





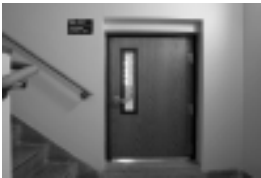
Fire Protection

Fire Egress (**CFSC # 24.2.4**)

Doors

- **Doors:** "Doors that are in the path of travel of a means of escape, other than bathroom doors in accordance with 24.2.4.2, shall be not less than 28 in. wide.
- Bathroom doors 24 in. wide
- Doors shall be not less than 78 in. in nominal height
- Every closet door latch shall be such that children can open from inside the closet
- Every bathroom door shall be designed to allow opening from outside during an emergency when locked.
- Doors shall be swinging or sliding
- No Door in any means of escape shall be locked against egress when the building is occupied. All locking devices that impede or prohibit egress or that cannot be easily disengaged shall be prohibited.

How High?



You said 28" wide?



Why can't I lock myself in?



Smoke Detectors

▪ Placement & locations:

780 CMR 3603.16.10
&
NFPA 72

Placement & Locations

- The placement of smoke detectors in single family homes. 780 CMR 3603.16.10 provides guidance on the number of smoke detectors. This section, in part, reads smoke detectors/heat detectors are required in the following locations:
- In the immediate vicinity of the bedrooms (Within 15')
- In all bedrooms
- In each story of a dwelling unit, including basements and cellars, but not including crawl spaces and uninhabitable attics
- In residential units of 1,200 square feet or more, automatic fire detectors, in the form of smoke detectors shall be provided for each 1,200 square feet of area or part thereof
- Any smoke detector located within 20 feet of a kitchen or bathroom containing a tub or shower must be a photoelectric type
- The 1996 edition of NFPA 72 gives further guidance on the placement of smoke detectors, when required. Some examples from Chapter 2 of NFPA 72 are as follows:
- In unfinished construction, detectors should be mounted on the bottom of floor joists
- Smoke detectors in a room with a ceiling sloped greater than one foot in eight feet horizontally, should be located on the high side of the ceiling
- Smoke detectors should not be located within three (3) feet of a door to a bathroom containing a tub or a shower or the supply registers of a forced air HVAC system
- Further guidance is provided by NFPA 72 for dead air spaces. Smoke detectors can be located on the ceiling with the side of the detector greater than four (4) inches from the wall or on the wall of a room with the top of the detector located four (4) to twelve (12) inches down from the ceiling (see attached diagram from NFPA 72).
- All smoke detectors should be installed in accordance with the manufacturer's recommendation and be UL listed.

Types and applications

- There are 2 types of smoke detectors
- Ionization detectors
- Photoelectric

▪ Ionization and Photoelectric Smoke Alarms

- A comprehensive study on residential smoke alarm technology was recently completed by the National Institute of Standards and Technology, along with Underwriters Laboratories, the US Fire Administration, the US Consumer Product Safety Commission, the US Centers for Disease Control and Prevention, and other sponsors. This work evaluated current and emerging smoke alarm technology responses to common residential fire scenarios and nuisance alarm sources (the link to published work on the NIST website is <http://smokealarm.nist.gov/>). While additional research continues, the following information can be verified at this time.
- **Early detection of fires is crucial to escape time**, because the time to untenable conditions in residences can be **as little as 3 minutes** for typical flaming fire scenarios. **Both ionization and photoelectric smoke alarm technologies quickly alert occupants in most fire scenarios.**
- In controlled experiments, ionization alarms react earlier than photoelectric alarms in fast-flaming fires, such as those involving paper or flammable liquids, while photoelectric alarms tend to react substantially earlier than ionization alarms in smoldering fires, such as those ignited by cigarettes in upholstered furniture, bedding materials, and mattresses.
- Experts recommend that a home have both ionization and photoelectric alarms or dual alarms to ensure the fastest response to both flaming and smoldering fires. Ionization alarms cost about \$5 retail, photoelectric alarms cost about \$20 and dual alarms cost about \$30.

- **All smoke alarms must be kept free of dust and insects.** Current manufacturers' guidance is to test alarms weekly and clean them monthly to make sure they operate properly. If the unit is battery operated or has battery back-up, the batteries should be replaced at least once a year. In addition, experts say that the smoke alarm unit itself should be replaced every 10 years.
- **Never remove the batteries to disable a smoke alarm**, even if you experience "nuisance" alarms, such as while cooking or showering. Fan the detector with a newspaper or towel to stop the alarm. Clean the smoke alarm according to the manufacturer's instructions, and if possible relocate it away from the kitchen or bathroom. Some smoke alarms have a silencing feature, so nuisance alarms can be stopped quickly and easily.
- Evidence indicates that some children may not awaken from the sound of a smoke alarm. Parents should hold a fire drill during the night so they can assess their children's ability to awaken and respond appropriately. If children, or any other family members, do not awaken to or hear the smoke alarm, the home escape plan should be adjusted accordingly to help get all family members out safely. **NASFM is aware of certain types of alarms that project a recording of the parents' voice or some other sound to which children may be more responsive than the traditional alarm.**
- **For elderly people**, those who have impaired hearing or those who have other disabilities that make the alarm difficult to hear, **there are smoke alarms that use strobe lights and vibrators in addition to sound**. Exploring alternative approaches such as these may make sense in those households.

Our Certification classes

- **Who For ??**
 - *The people that pound the nails!!*
 - *The people that work for the people who pound nails!!*
 - *Building Officials, engineers & architects*
 - *Home Inspectors*
- **What will be covered ??**
 - *Fundamental Foundations, Carpentry and Framing*
 - *Brick, Wood, Steel, Plastic – Where, When & How*
 - *Weather Protection – A snug down Parka for your house*
 - *Oil, Wood, Gas, Solar – Which & Why??*
 - *Basic Electricity & Plumbing – Do's & Don'ts*
 - *IRC & Fire Codes*
 - *Safety and First Aid*
 - *It's Your Business – Insurance, Bonding & Liability*
- **Why would you want to go ??**

Thank You and....

- We Look Forward to seeing you in our future classes!!

Brian Dunbar for Sherwood Inspection Services

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